WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Primary Health Care Access and Socio-Economic Conditions of The Patients in Sepahijala District, Tripura

V. Saravanabavan[1], Khakchang Debbarma[2], C Vinothini[3]

[1]Associate Professor, Department of Geography, School of Human and Environmental Sciences, North Eastern Hill University, Shillong-793022, Meghalaya, India.

[2]PG Project Fellow, Department of Geography, School of Human and Environmental Sciences, North Eastern Hill University, Shillong-793022, Meghalaya, India.

[3]Research Scholar, Department of Geography, School of Earth and Atmospheric Sciences, Madurai Kamaraj University, Madurai- 625021, Tamil Nadu, India.

DOI : https://doi.org/10.55248/gengpi.6.0125.0207

ABSTRACT

Healthcare utilization is a critical determinant of population health, reflecting both accessibility and equity in healthcare systems. This study explores healthcare utilization patterns and socio-economic factors influencing access to healthcare in Sepahijala District, Tripura, a predominantly rural area characterized by reliance on agriculture and rubber plantations. A structured questionnaire was administered to a stratified random sample of 80 respondents to assess socio-economic characteristics and their impact on healthcare usage. The findings highlight significant disparities in access to healthcare based on age, gender, income, and education levels. While most respondents expressed satisfaction with services provided by Primary Health Centers (PHCs), persistent challenges such as inadequate medication availability, long waiting times, and poor transportation infrastructure were reported. The study employed Nearest Neighbour Analysis to examine the spatial distribution of PHCs and its effect on healthcare accessibility. The results emphasize the urgent need for interventions to improve medication availability, streamline service delivery, and enhance transportation networks, aiming to address socio-economic and logistical barriers and promote equitable healthcare access in rural areas.

Keywords; Healthcare Utilization, Socio-Economic Conditions, Primary Health Centers , Rural Healthcare, Patient Satisfaction

1.INTRODUCTION

Healthcare utilization is a critical determinant of population health, reflecting both accessibility and equity in healthcare systems. Socio-economic factors, including income, education, occupation, and geographic location, play a pivotal role in determining healthcare utilization patterns (1,2,3). Healthcare utilization in rural districts like Sepahijala, Tripura, is shaped by the interplay of socio-economic conditions, infrastructure availability, and cultural dynamics. Research highlights that age, gender, and economic status are critical determinants of healthcare access and outcomes(4,5).Studies have consistently reported gender-based disparities in healthcare utilization, with women often facing greater challenges due to cultural norms and limited autonomy (6,7,8).Economic barriers, particularly in low-income groups, exacerbate these disparities, limiting access to quality care and leading to higher out-of-pocket expenditures (9,10,11).The availability of healthcare infrastructure, including the number of beds, waiting times, and medication supply, plays a pivotal role in shaping patient satisfaction (12,13,14). Evidence from primary healthcare settings across India indicates that long waiting times and insufficient medicine availability remain persistent challenges, reducing trust in public health systems (15,16,17). Moreover, reliance on traditional habits, such as tobacco use, contributes to preventable health conditions, creating an additional burden on rural healthcare systems (18,19,20).Transportation and geographic accessibility are also significant barriers in rural settings like Sepahijala, where patients often travel long distances to access primary health centers (21,22,23).This issue aligns with findings from other rural districts in Northeast India, where high transportation costs and inadequate infrastructure deter timely healthcare utilization (24,25,26).Addressing these challenges requires targeted policy interventions to enhance healthcare infrastructure, reduce waiting times, and improve access to medicines and transport. Evidence-based strategies such as deploying mobile health units, optimizing appointment systems, and subsidizing transportation costs have shown promise in similar contexts (27,28,29).

2. STUDY AREA

Sepahijala, one of Tripura's newly constituted districts, was established on January 13, 2012, as a division of the former West Tripura district. Located in the southwestern extreme of the state, the district spans an area of 1,043.04 sq. km, making it the fifth-largest among Tripura's eight districts and

accounting for approximately 9.95% of the state's total geographical area. Sepahijala lies between 25°07' and 25°41' N latitude and 91°21' and 92°09' E longitude. Bishramganj serves as the district headquarters. (Fig 1).

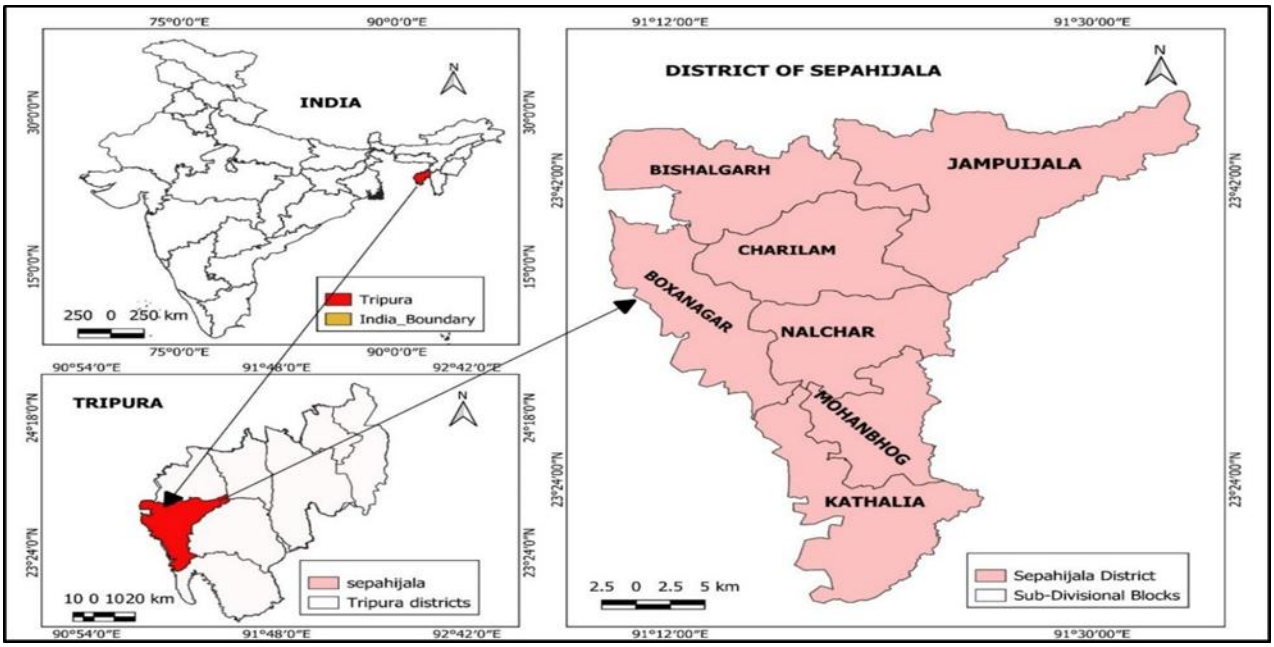

Fig 1: Study map of Sepahijala District

The district's terrain is predominantly plain, covering about 88% of its area, while minor steep ranges of the Baramura hills occupy the remaining 12%. Agriculture forms the backbone of the district's economy, as most of the area is rural. Rubber plantations have become a significant source of livelihood for many local residents, supplementing traditional agricultural practices. The district's total population stands at 542,731, reflecting its socio-economic dependence on primary sector activities.

3.OBJECTIVE

To find out the spatial distribution and location pattern of PHC in Sepahijala district

To assess the socio-economic characteristics of the patients in Sepahijala District,

To analyse patient satisfaction levels with PHC services.

4.METHODOLOGY

Data Collection: Both Primary and Secondary data from a respective field in the study area and the district medical office located in the Sepahijala District . A stratified random sampling with questionnaire technique was employed to ensure representation of diverse socio-economic, cultural ,and health care satisfaction level . The sample comprised 80 respondents, selected from various PHCs across the district. Descriptive statistics were applied to analyze socio-economic diversity and healthcare utilization patterns.To study the spatial distribution of the Primary Health Center, the Nearest-Neighbour Statistical tool was used to show the distributional pattern of the PHCs . formula,

$Rn = 2\check{D}\sqrt{(n/a)}$

Rn is the nearest neighbour index.

D = the average distance between each point and its nearest neighbour

n = the number of points under study

A = the size of the area under study

The Nearest Neighbour Analysis examines how something is distributed or spread out over a certain area.

5. RESULT AND DISCUSSION

Sex Ratio

The male respondents constitute above 80% and the females constitute about 48%. This confirms definitely that male populations are more mobile than female populations (Table 1)

Age Structure

One important factor in healthcare studies is the age group. An examination of . It is also evident that the respondents in the group of 20-39 years utilize i.e., 34% of the health centers. The respondents in the age group of <60 years utilize much less i.e, 8% of the health centers.(Table 2).

The Socio-Economic Conditions of the Patients in Sepahijala District

The patients' socioeconomic backgrounds were examined to see why the utilization pattern varies. Through the administration of questions about age, sex, mother tongue, religion, educational background, marital status, family size, occupation, and income, a primary survey is used to gather information about the socioeconomic circumstances of the respondents. (30,31,32). The way that patients from various socioeconomic backgrounds use the amenities at the health center is referred to as the use pattern.

Social Status of the Respondents

Type of Family

The type of family is also relevant in health care research. It may be noted that the majority of responders had a single family. The research on the type of family finds that 56% are single families. 36% is made up of joint families and the other 8% reported as others.Family size is also essential in healthcare research. It may be noted that a majority of respondents' family sizes are large. (Table 3).

Drinking Water

Drinking water is a better measure to analyze the social status of a respondent (33,34). Most of the respondents in the sample areas like to drink from the water supply provided by the government in almost every house and water from hand pumps and wells. Regarding the source of drinking water, about 40% of the respondents get their drinking water from the water supply, 28% from hand pumps,6% from wells, and 26% from other sources.

Mode Of Transport

About 46% of the respondents travel by two-wheelers to reach the health center and 20% of them use the bus as their means of transport. 2% reach by cycle and 32% of respondents use other means of transport to reach the health centre like walking. (Table 4).

Economic Status of the Respondents

One important aspect influencing a patient's or respondent's decision to select a higher or lower-quality healthcare facility is their economic position (35,36). Therefore, an evaluation of their financial status is required.

Occupation

The occupation factor also plays a crucial role in determining the characteristics of the respondents and varies from macro to meso and micro level. The study area is rural in nature.

Among the respondents, 16% of the respondents are cultivators or Agricultural labourers, 24% of the Respondents are engaged in Non-Agricultural Labour and 28% of the respondents are in the Professional Sector. Others constitute 32%.(Table 5)

Monthly Income

The monthly income is an important factor that decides the type and treatment for a specific disease the people can afford **(**37,38**).** In the Jampuijala sub-division, the majority of the respondents were in the middle-income group.(Table 6).The income level of the respondents ranges from <5000 - >15000. About 30% of the respondents belong to the income group of less than R.s <5000 and 24% of the respondents were included in R.s 5000-10000. Another 26% were categorized in the income group of R.s 10000-15000, and 20% of them come under the >15000 income group.(Table 6)

Health Measures and Related Aspects

Sources of Disease

The analysis of the gat disease pattern of the respondents that 06% of water and 8 % of the respondents were in the air and 10% of the respondent's gat mosquitoes and 76 % of the respondents gat disease in others (Fig 2).

The District of Sepahijala Health Care Center gives treatment for all types of diseases. The analysis of the disease pattern of the respondents reveals that 24% of the respondents suffer from fever, 8% from diabetes, 2% from Hypertension, 16% from headaches, and 50% of respondents

suffer from other diseases (Fig 6).

Table 1 : Gender

Gender	**Respondents in percentage**

Male	80
Female	20

Distribution of the Primary Healthcare Center

There are 3 PHCs are located in the northern region and 3 PHCs located in the centre of the district, the other 2 PHCs are found in the southern region of the Sepahijala district over the study area. (Fig 2). The Subdivision of Jampuijala has 2 PHCs located in the area and has a distance of 11.08 Km. between the two of them. The sub-division of Jampuijala occupies a large area, and it constitutes of mostly rural region and often faces challenges such as limited access to healthcare facilities and transportation issues. By placing two PHCs 11.08 km apart, the healthcare system aims to ensure that more people can access medical services without traveling long distances.

Table 2: Age Structure

Age Group	**Respondents in percentage**
< 20	14
20-39	34
40-49	26
50-59	18
>60	08

Table 3: Family Size

Family Size	**Respondents in percentage**
<2	16
2 – 4	54
4 – 6	30

Table 4: Mode of Transport

Mode of Transport	**Respondents in percentage**
Bus	20
Two-wheeler	46
Cycle	02
Others	32

Table 5: Occupation

Occupation	**Respondents in percentage**
Cultivator/Agricultural Labour	16
Non-Agricultural Labour	24
Professional	28
Others	32

Table 6: The monthly income of the respondents

Income	Respondents in Percentage
R.S <5000	30
5000-10000	24
10000-15000	26
>15000	20

Fig 2 Sources of Diseases

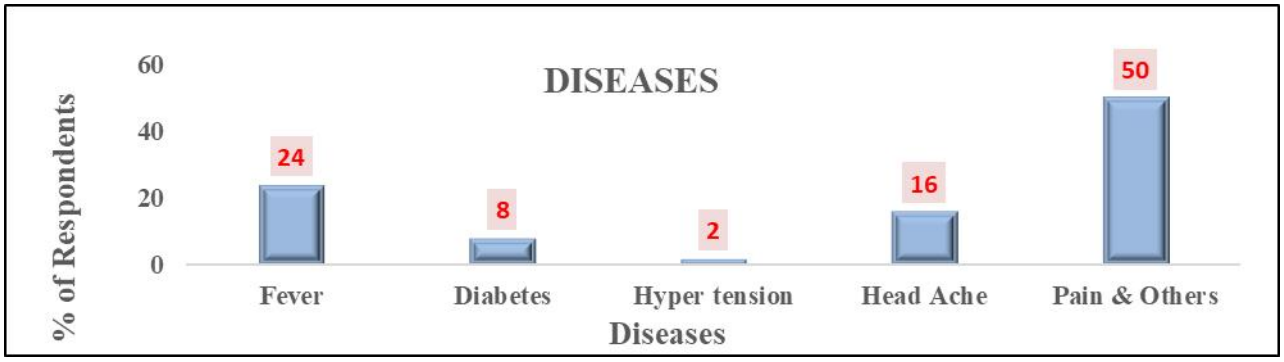

Fig 3 Types of Diseases

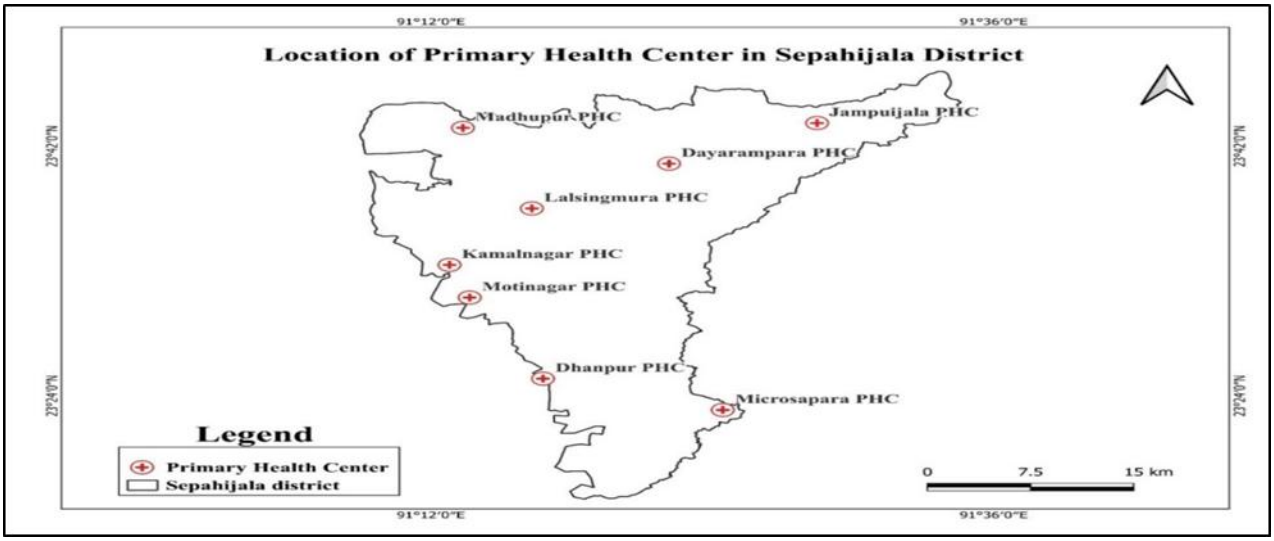

Fig 4 Spatial Distribution of PHC in Sepahijaia district

Table 7: Distance between Primary Health Centers

Sl. No	PHC Name	Nearest PHC	Distance in KM
1	Microsapara	Dhanpur	13.767
2	Dhanpur	Motinagar	11.926
3	Motinagar	Kamalnagar	04.647
4	Kamalnagar	Motinagar	04.647
5	Lalsingmura	Kamalnagar	09.682
6	Dayarampara	Lalsingmura	11.548
7	Jampuijala	Dayarampara	12.08
8	Madhupur	Lalsingmura	11.866
		Average(d)=	10.020

The Kathalia Sub-division also consists of 2 PHCs in the region. Boxanagar Sub-division also has 2 PHCs namely, Kamalnagar and Motinagar present in the region. The regions of Kathalia and Boxanagar have a large area and are predominantly rural, necessitating multiple PHCs to cover the population adequately. The PHCs of Madhupur and Lalsingmura are located in the sub-division of Bishalgarh and Charilam respectively and are placed strategically to cater to the needs of the people in the region.

Nearest-Neighbour Analysis

The Nearest Neighbour Analysis examines how something is distributed or spread out over a certain area. It gives a numerical value that indicates how regularly spaced or clustered a set of points are. To determine whether the spatial frequency of something observed is comparable with other areas, researchers utilize nearest neighbor analysis (39,40). It can give scholars a figure that represents the "clustering" of a geographical phenomenon, enabling them to calculate more precisely in comparison to other locations. (Table 1).

The pattern of the distribution can be either cluster, Random, or uniform according to the randomness value we get. Since the Randomness value of the PHCs is 1.67, it means that The PHCs are uniformly distributed.

So to analyze the distribution of PHCs using the nearest neighbour analysis, we will input the formulary = 2Ď √(n/a)

Therefore, Rn=1.44 , Randomely distribution of PHC in Saehijals districts

Table 7: Identification of PHC location pattern

Randomness Index	Value
Cluster	0-0.5
Random	**0.6-1.5**
Uniform	1.6-2.15

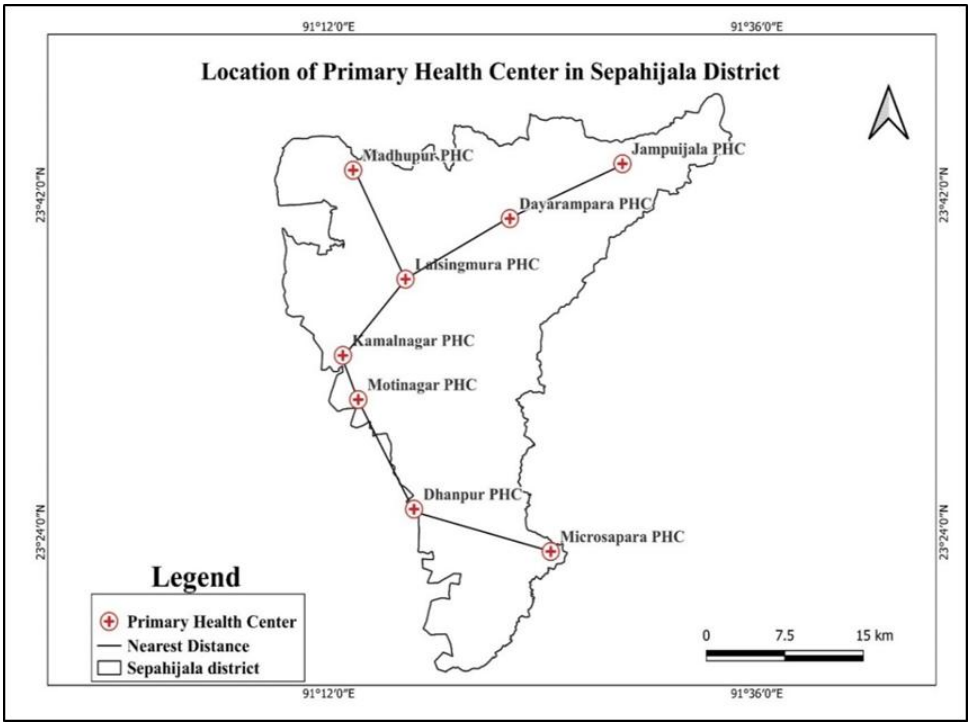

Fig 5 Nearest-Neighbour of PHC

Satisfied With Medical Services

The people who use the health center for their medical services also avail the medical facilities. The level of satisfaction of the respondents in the Sepahijala District is given in the following table.(Table 8).

About 35% of the respondents have expressed that the services are very good and 50% of them felt that the service provided by the healthcare center was good. 15% of the respondents have expressed that it is better.

Level of Satisfaction

In general, patients in the Sepahijala district are satisfied with their primary healthcare (PHC) providers. There was high satisfaction with the services, as indicated by the majority of patients rating them as good or very good. According to the survey findings, a sizable majority of patients believe that the current healthcare system is successfully meeting their demands (41,42).

There are other elements that lead to this high degree of satisfaction. The study discovered that patients preferred allopathic care and that common health problems, like fever and headaches, were adequately treated (43,44,45). Furthermore, the majority of patients reported being in good overall health, indicating that the healthcare system is effective in preserving and enhancing population health. Patient satisfaction is further supported by the availability of health centers, affordable travel times, and the choice of contemporary medical care (46,47,48). To significantly increase patient satisfaction, certain areas still require work. The availability of medications and the length of time patients must wait to see a doctor has drawn criticism. It may be annoying and inconvenient for certain patients to have to wait longer than forty-five minutes. Reducing wait times and guaranteeing a steady supply of medications will help address these problems, which could result in even greater patient Satisfaction and more effective healthcare delivery in the area.

Waiting Time

One major issue with a health center's functioning is the duration of time it takes to visit a doctor. People in a health center wait a long time to see a doctor. Seeing a doctor takes longer at many PHCs. (Table 8).

Table 8: Waiting Time

Waiting time	**Respondents in percentage**
Mints < 15	16
15 – 30	56
30-45	18
>45	10

About 16% of respondents in the research area said they had to wait less than 15 minutes to see a doctor, while 56% said they used to have to wait between 15 to 30 minutes. Similarly, 18% of the respondents said they have to wait for about 30 to 45 minutes and 10% of the respondents used to wait for more than 45 minutes. (Fig 8).

Perception Of People On Healthcare Systems

Treatment Preferred

The type of treatment the people rely on is also an important aspect in the planning of the healthcare system. (Table 9).

Table 9: Preference to Choice of Treatment

Medical system	**Respondents in percentage**
Allopathic	72
Homeopathy	22
Others	04

About 72% of the respondents prefer allopathic treatment and 22% of the respondents will follow Homeopathy and 4 % of the respondents prefer other types of treatment.

Travelling Pattern Of The Patients

Distance to the Primary Health Centre

When planning the location of a health center, the distance to the primary health center is a crucial consideration. (Table 10).

Table 10: Distance to Health Centre

Distance in Km	**Respondents in percentage**
< 5	16
5 – 10	46
10-15	22
>15	08

About 16% of the respondents had less than 5km to reach the health centre and 46% of the respondents were 5 to 10 km away from the health centre. 22% of the respondents had a 10-15 km distance to the health center and the other 8% had more than 15 km.

About 28% of the respondents took less than 15 minutes to reach the health center and 32% of them were of the opinion that it took 15-30 minutes. Around 24% of them needed 30-45 minutes and the other 18% took more than 45 minutes to reach the health center.

6.CONCLUSION

The analysis of healthcare utilization and socio-economic conditions in Sepahijala District underscores both strengths and areas for improvement in the healthcare delivery system. High literacy rates and broad satisfaction with the quality of allopathic treatment reflect a promising foundation. However, persistent challenges such as medication accessibility, prolonged waiting times, and inadequate transportation infrastructure hinder equitable healthcare access. Addressing these issues through enhanced resource allocation, streamlined service delivery, and targeted interventions is imperative. By bridging these gaps, the district can move towards a more inclusive and efficient healthcare system, ensuring better health outcomes for all socio-economic groups, particularly those in underserved rural areas. The spatial analysis of Primary Healthcare Centers (PHCs) in Sepahijala District reveals a predominantly randomly distribution, with an Rn value of 1.44. This pattern reflects strategic efforts to ensure healthcare accessibility for rural and semi-urban populations. The placement of PHCs in northern and central regions accommodates the population density and infrastructure of these areas, while southern regions face challenges due to limited facilities and transportation barriers.

Patients in the Sepahijala district have a generally positive opinion of the healthcare delivery system, but there is definitely a need for improvement. Even more patient satisfaction would probably result from expanding access to medications, cutting down on wait times, and enhancing transportation alternatives. The study offers insightful information about the advantages and disadvantages of the current system, laying the groundwork for the next initiatives to enhance regional healthcare delivery.

7.REFERENCES

1.Saravanabavan, V., Balaji, D., & Preethi, S. (2019). Identification of dengue risk zone: A geo-medical study on Madurai city. *GeoJournal*, *84*, 1073-1087.

2.Vinothini, C., Suja Rose, R. S., & Saravanabavan, V. (2024). Assessment of primary health care accessibility and patients' perception in Madurai district: a geo-medical study. *GeoJournal*, *89*(5), 211.

3.Rao, K. D., Sundararaman, T., Bhatnagar, A., Gupta, G., Kokho, P., & Jain, K. (2013). Which doctor for primary health care? Quality of care and non-physician clinicians in India. *Social science & medicine*, *84*, 30-34.

4.Vinothini, C., & Saravanabavan, V. (2022). Spatial Distribution of Emerging Diseases in Madurai District: A Geo Medical Study. *International Journal of Innovative Science and Research Technology*, *7*(6), 2456-2165.

5.Saravanabavan, V., Vinothini, C., & Rose, R. S. (2023). Spatial distribution of primary health care centre and socio-economic conditions of patients in Madurai district. *International Journal of Geography, Geology and Environment*, *5*(2), 192-198.

6.Mustafa, A., & Shekhar, C. (2021). Is quality and availability of facilities at Primary Health Centers (PHCs) associated with healthcare-seeking from PHCs in rural India: An exploratory cross-sectional analysis. *Clinical Epidemiology and Global Health*, *9*, 293-298.

7.Balaji, D., Saravanabavan, V., & Katturajan, K. (2024). Geo-modeling approach of determinants of Chikungunya and its spatial distribution pattern in Madurai city, Tamil Nadu, India. *GeoJournal*, *89*(3), 109.

8.Saravanabavan, V., Keerthi, S. P., Anupama, A., & Vinothini, C. (2019). Psycho-social characteristics of mental disorder patients in Thiruvananthapuram District: A geo medical study. *International Journal of Geography, Geology and Environment*, *1*(2), 08-16.

9.Ramani, S., Sivakami, M., & Gilson, L. (2019). How context affects implementation of the Primary Health Care approach: an analysis of what happened to primary health centres in India. *BMJ global health*, *3*(Suppl 3), e001381.

10.Vinothini, C., & Saravanabavan, V. (2023). Determinants of health care facilities and patients' accessibility to PHC in Madurai district. *International Journal of Geography, Geology, and Environment*, *5*(2), 17-22.

11.Saravanabavan, V., & Shanmuganandan, S. (1994). Geo-Medical analysis of Leprosy patients in Tamilnadu. *The Indian Geographical Journal*, *69*(2), 135-139.

12.Saravanabavan, V. (1997). Geo-Medical analysis of Multibacillary Leprosy in Tamil Nadu. *The Deccan Geographer*, *35*(2), 179-189.

13.Saravanabavan, V., Vinothini, C., & SujaRose, R. S. (2024). Transport accessibility and efficiency of PHC location in Kanyakumari district, Tamil Nadu. *International Journal of Science and Research Archive*, *11*(2), 1342-1351.

14.Saravanabavan, V., & Shanmuganandan, S. (1996). Pattern of leprosy treatment and health care situation in Tamil Nadu. *Annals of the National Association of Geographers, India*, *16*(2), 25-35.

15.Radhakrishnan, R., & Vaithialingam, S. (2023). Exploring the Suitability of Groundwater for Domestic Water Quality and Irrigation Purpose in Dindigul District, Tamil Nadu. In *Surface and Groundwater Resources Development and Management in Semi-arid Region: Strategies and Solutions for Sustainable Water Management* (pp. 253-277). Cham: Springer International Publishing.

16.Geo spatial Analysis of Communicable diseases in Madurai District C.Vinothini, R.S Suja Rose and V. Saravanabavan. International Journal of Humanities Social Science and Management, Vol 4, Issue 3,2024. Pp 1145-1153.

17.Jeganathan, G., Srinivasan, S. K., Ramasamy, S., & Govindharaj, P. (2024). Accessibility and availability of maternal and reproductive health care services: ensuring health equity among rural women in Southern India. *BMC Primary Care*, *25*(1), 145.

18.Saravanabavan, V., Balaji, D., Rahamath, N. R., Preethi, S., & Vadivel, S. (2020). Geo-ecological association of dengue disease in Madurai city-using multivariate analysis.

19.Srivastava, A. K., Gupt, R. K., Bhargava, R., Singh, R. R., & Songara, D. (2023). Utilisation of rural primary health centers for outpatient services-a study based on Rajasthan, India. *BMC Health Services Research*, *23*(1), 387.

20.Saravanabavan, V. (2013). Patients' perception and travel behavior pattern in primary health care center in Haripad block-A micro Geo-medical study. *Journal of Language in India*, *13*(4), 194-207.

21.Baruah, M., et al. (2023). Geographic accessibility and healthcare barriers in Northeast India: A case study. *Regional Health Studies, 29*(1), 45–60.

22.Saravanabavan, V., Aneesh, P., Babu, H. M., & D Harieswari, M. (2021). Patient's perception and level of primary health care utilization in east block of Madurai North taluk: A geo-health study. *International Journal of Geography, Geology and Environment*, *3*(1), 34-41.

23.Saravanabavan, V., Eswari, S., Vimala Vinnarasi, J., Ganesan, J., & Sudharsan, R. (2020). Spatial temporal variation of leptospirosis disease in Madurai city–Medicogeographical analysis. *International Journal of Geography, Geology and Environment*, *2*(1), 21-7.

24.Jayarajan, K., & Lakshmi, K. (2014). Geographical variation of major communicable disease in Kerala state, India. *International Journal in Management & Social Science*, *2*(7), 24-36.

25.Saravanabavan, V., & Abeesh, P. (2020). Environmental health status of fishermen in Mahe district. *International Journal of Geography, Geology and Environment*, *2*(2), 95-102.

26.Vinothini, C., Saravanabavan, V., & Emayavaramban, V. (2022). Location Accessibility of PHC and Health care travel performance in Madurai District. *International Journal of Innovative Science and Res3earch Technology. ISSN*, (2456-2165), 7.

27.Saravanabavan, V. (1996). Bicycles and health-a geo medical study of Madurai city. In *Velo Australis and Velo-City'96, International Bicycle Conference, 1996, Fremantle, Western Australia*.

28.Saravanabavan, V., Emayavaramban, V., Thangamani, V., Manonmani, I. K., Rose, R. S., Balaji, D., ... & Vinothini, C. (2023). Spatial variation of covid-19 morbidity status and identification of risk zone in Tamil Nadu (India) during first wave. *GeoJournal*, *88*(2), 1341-1354.

29.Sankar D, H., Joseph, J., Benny, G., & Nambiar, D. (2023). Of primary health care reforms and pandemic responses: understanding perspectives of health system actors in Kerala before and during COVID-19. *BMC primary care*, *24*(1), 59.

30.Saravanabavan, V., Sudharsan, R., Balaji, D., & Rahamath Nisha, R. (2014). Patient's perception and epidemiological characteristics of dengue in Madurai city-using factor analysis. *International Journal of Mosquito Research*, *1*(2), 18-24.

31.Saravanabavan, V., Reejo, R. J., Neethidevi, A., & Jayashree, R. (2006). Travel and health care utilization pattern of patients in Vadippati panchayat union: A micro level study using GIS. *Journal of Deccan Geographer*, *44*(2), 97-108.

32.Vinothini, C., Neethidevi, A., & Saravanabavan, V. (2019). Health impact and nine fold classification of land use change in Nilakottai Taluk, Dindigul District, Tamil Nadu. *International Journal of Geography, Geology and Environment*, *1*(1), 80-86.

33.Vinothini, C., Saravanabavan, V., & Rose, R. S. (2024). Travel patterns of adult patients to primary health centers in Madurai district: A public health perspective. *International Journal of Science and Research Archive*, *13*(1), 141-149.

34.Saravanabavan, V, Vinothini C, Balaji D,A Manna, A Mohan, A Rejesh (2022) A Geo- spatial approach on COVID-19 mortality in Tamilnadu. International Journal of Geography, Geology and Environment 4 (1), 123-131

35.Geospatial analysis of health care resource allocation in Karuur district: Insghts from GIS Umasankar, R.Vijaya, V. Saravanabavan. Shodhkosh: Journal of Visual and Performing Arts (UGC- Care list) (2024) 5 (1) pp 646-655, https://DOI 10.29121/shodhkosh. v5.i1.2024.204 0

36.Sumathi, G. N., Kamalanabhan, T. J., & Thenmozhi, M. (2015). Impact of work experiences on perceived organizational support: a study among healthcare professionals. *AI & society*, *30*, 261-270.

37.Saravanabavan, V., Sangma, N. N., & Vinothini, C. Spatial Distribution and Pattern of Location in Primary Health Centers in West Garo Hills District, Meghalaya.

38.Geetha, S., & Maniyosai, R. (2019). An Evaluation Of Maternal Health Care Services In Primary Healthcare Centers (Phc) In Thanjavur District Tamil Nadu. *International Journal Of Environment, Ecology, Family And Urban Studies (Ijeefus)*, *9*, 11-16.

39.Spatial Distribution and Female Travel Behavior: Enhancing Primary Health Care Services in Madurai District C.Vinothini, R.S. Suja Rose, V. Saravanabavan (2024) International Journal of Engineering Applied Sciences and Technology, 2024 Vol. 9, Issue 05, ISSN No. 2455-2143, Pages 193-199

40.Saravanabavan, V. (2011). GIS analysis of pedestrian problem and spatial risk areas for each buffer zone in Urban cities a case study of Madurai city in Tamlnadu, India.

41.Saravanabavan, V., Lekha, C. A., Aparna, T., Nisha, R. R., Balaji, K. K., & Kanna, S. V. (2021). Spatio-temporal variation of dengue in Kozhikode District, Kerala: A medico geographical study. *International Journal of Mosquito Research*, *8*(1 Part B), 130-140.

42.K Katturajan (2017) Weather-Elements-Impacts-On-Malaria-Surveillance-In-The-Coastal-Blocks-Of-Ramanathapuram-District-Tamilnadu-India. Advance Research Journal Of Multi-Disciplinary Discoveries 14 (1), 41-47

43.Saravanabavan, V., Reshma, C. U., & Preethi, S. (2021). Determinants of reproductive health in working women in Thrissur district, Kerala. *GeoJournal*, *86*, 239-253.

44.Saravanabavan, V., Balaji, D., Reshma, C. U., Sheheersha, S. K., Sudharsan, R., Vimala Vinnarasi, J., ... & Balasubramani, K. (2021). Urban disease ecology and its spatial variation of Chikungunya in Madurai City, Tamilnadu, India: a geo-medical study. *GeoJournal*, *86*, 2335-2350.

45.Saravanabavan, V. (2000). An analysis of pattern of leprosy and regional classification of Health Care service in Tamilnadu. *Geography Review of India*, *62*(4), 379-386.

46.Perera, S., Ramani, S., Joarder, T., Shukla, R. S., Zaidi, S., Wellappuli, N., ... & Rao, K. D. (2024). Reorienting health systems towards Primary Health Care in South Asia. *The Lancet Regional Health-Southeast Asia*, *28*.

47.Lahariya, C. (2020). Health & wellness centers to strengthen primary health care in India: concept, progress and ways forward. *The Indian Journal of Pediatrics*, *87*(11), 916-929

48.World Health Organization. (2021). Strategies for equitable healthcare access in low-resource settings. *Global Health Equity Reports, 17*, 89–104.

49.Chaudhuri, S., et al. (2022). Economic determinants of healthcare utilization in low-income households in Northeast India. *International Journal of Health Economics, 14*(2), 78–89.